

Tutorial: Conventional Curve Number

NASA DEVELOP Riley County Water Resources – Summer 2020

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Procedure Summary

This tutorial demonstrates the calculation of conventional curve numbers based off static curve number tables. For this tutorial, you will need synthesized land use and land cover maps and the preferred curve number tables. This processing was done using ArcMap.

Data Used

gSSURGO: <https://nrcs.app.box.com/v/soils/folder/94128402340?page=3>

NLCD: <https://www.mrlc.gov/viewer/>

CDL: https://www.nass.usda.gov/Research_and_Science/Cropland/Release/

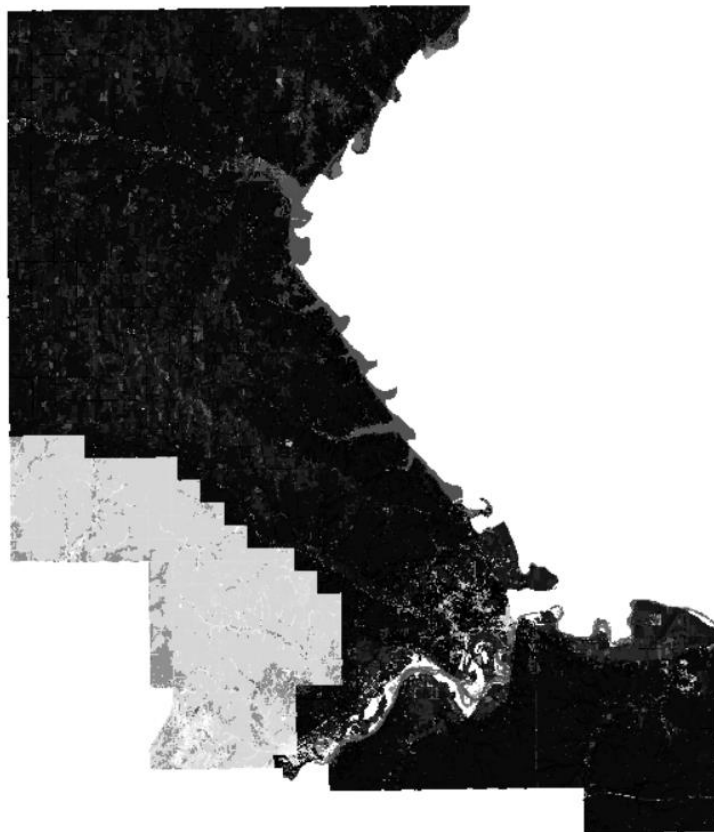
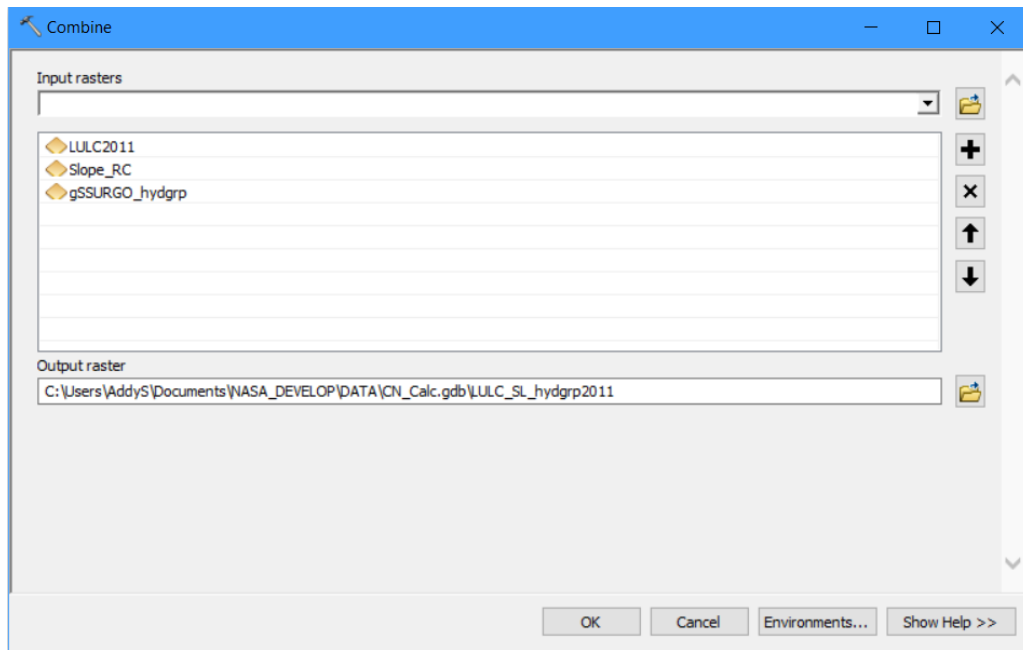
LiDAR-derived DEM: Provided by partners

**NLCD and CDL used to synthesize LULC raster layer

Calculating Curve Number

Combine

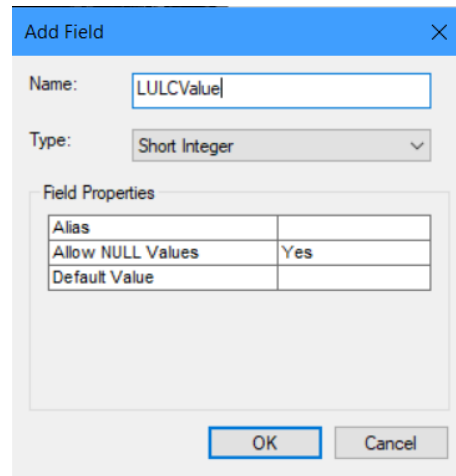
Use the **Combine** tool to combine the rasters 'LULCXXXX', 'Slope Reclass', and 'gSSURGO_hydgrp'



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Add Field

Open the attribute table of the combined rasters layer and **Add Field**. Name the field 'LULCValue' and leave the type as the default 'Short Integer'

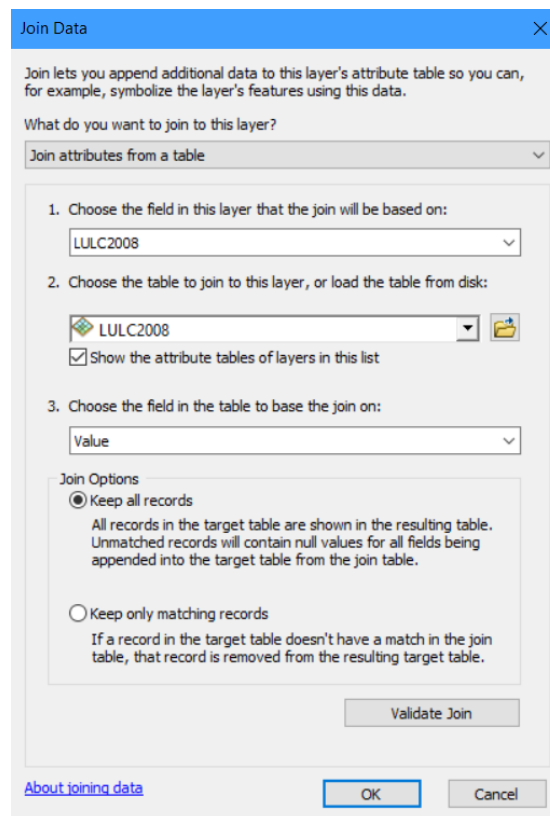


The 'Add Field' dialog box is shown. The 'Name' field contains 'LULCValue'. The 'Type' dropdown is set to 'Short Integer'. Below, the 'Field Properties' section contains a table with three rows: 'Alias', 'Allow NULL Values', and 'Default Value'. The 'Allow NULL Values' cell contains 'Yes'. At the bottom are 'OK' and 'Cancel' buttons.

Field Properties	
Alias	
Allow NULL Values	Yes
Default Value	

Join

Join the working year's 'LULC file' to the 'Combined Rasters' file. Join based on the 'LULC' column and the 'Value' column.



The 'Join Data' dialog box is shown. It explains that joining appends data to the layer's attribute table. The 'What do you want to join to this layer?' dropdown is set to 'Join attributes from a table'. Step 1: 'Choose the field in this layer that the join will be based on:' is set to 'LULC2008'. Step 2: 'Choose the table to join to this layer, or load the table from disk:' is set to 'LULC2008' with a checkbox 'Show the attribute tables of layers in this list' checked. Step 3: 'Choose the field in the table to base the join on:' is set to 'Value'. Under 'Join Options', 'Keep all records' is selected. A 'Validate Join' button is at the bottom right. At the very bottom are 'About joining data', 'OK', and 'Cancel' buttons.

1. Choose the field in this layer that the join will be based on:
LULC2008

2. Choose the table to join to this layer, or load the table from disk:
LULC2008
☒ Show the attribute tables of layers in this list

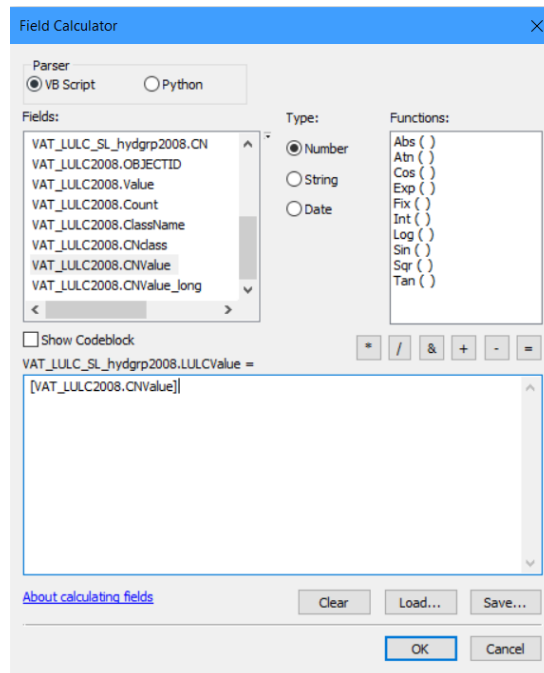
3. Choose the field in the table to base the join on:
Value

Join Options
☒ Keep all records
All records in the target table are shown in the resulting table. Unmatched records will contain null values for all fields being appended into the target table from the join table.
☐ Keep only matching records
If a record in the target table doesn't have a match in the join table, that record is removed from the resulting target table.

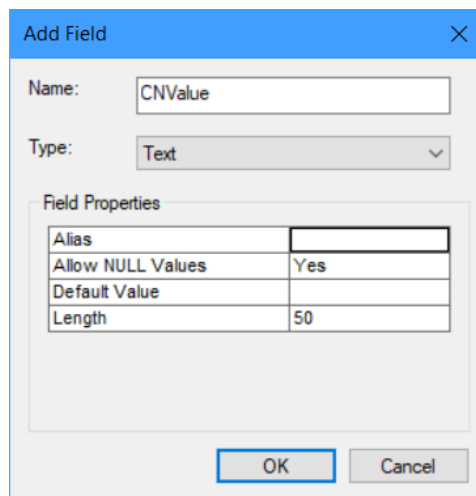
Validate Join

About joining data OK Cancel

Right click on the top of the 'LULCValue' field that was created and select **Field Calculator**. Set the LULCValue equal to "CNValue" from the joined LULC table.

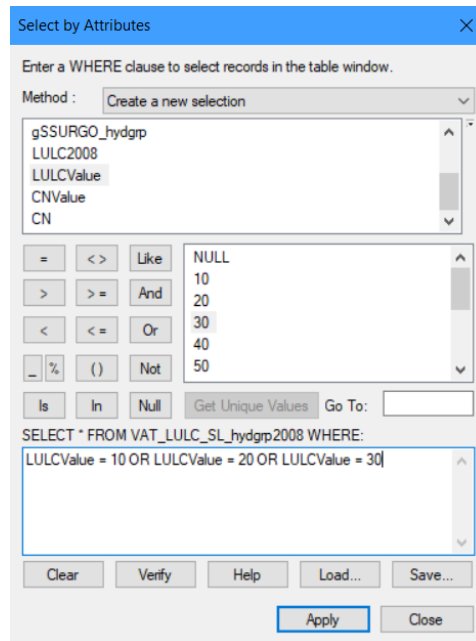


Add Field with the 'Combined Rasters' layer and this time name the field 'CNValue' and change the type to 'Text'

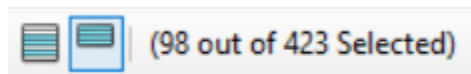


Select by Attributes

Open **Select by Attributes** and select from 'LULCValue' all values that equal 10, 20, or 30, using the statement **LULCValue = 10 OR LULCValue = 20 OR LULCValue = 30**.



Apply the selection and make only the selected features viewable. You should only be able to see records highlighted blue



Double click on the 'Slope_RC' column to sort the column. Using 'shift' **Select all "999"** records so they are highlighted yellow and then **Unselect** them from the current selection.

Table							
VAT_LULC_SL_hydgrp2008							
	OBJECTID *	Value	Count	Slope_RC	gSSURGO_hydgrp	LULC2008	LULCValue
	402	402	6	0	1	2	10
	407	407	1	0	999	2	10
	106	106	498	999	3	5	10
	119	119	337	999	3	1	10
	243	243	4	999	999	5	10
	272	272	77	999	3	8200	10
	273	273	274	999	3	24	20
	280	280	44	999	4	4	20
	287	287	70	999	4	8200	10
	288	288	61	999	4	24	20
	289	289	148	999	4	1	10
	290	290	11	999	2	5	10
	292	292	28	999	3	36	30
	293	293	30	999	4	5	10
	302	302	26	999	2	8200	10
	303	303	13	999	2	24	20
	304	304	1	999	2	26	10
	319	319	4	999	4	26	10
	320	320	14	999	3	26	10
	324	324	8	999	2	1	10
	328	328	2	999	999	1	10
	330	330	64	999	3	4	20

Right click on 'LULCValue'. Select **Field Calculator** and set 'LULCValue' equal to **[LULCValue] + [Slope_RC]**

Field Calculator

Parser

☒ VB Script
 ☐ Python

Fields:

OBJECTID
Value
Count
Slope_RC
gSSURGO_hydgrp
LULC2008
LULCValue
CNValue
CN

Type:

☒ Number
☐ String
☐ Date

Functions:

Abs ()
Atn ()
Cos ()
Exp ()
Fix ()
Int ()
Log ()
Sin ()
Sqr ()
Tan ()

☐ Show Codeblock

LULCValue =

[LULCValue] + [Slope_RC]

[About calculating fields](#)

Clear

Load...

Save...

OK

Cancel

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gSSURGO

Clear all selected records. Open **Select by Attribute** and use **gSSURGO_hydgrp = 1** to select all of soil type '1'.

Select by Attributes

Enter a WHERE clause to select records in the table window.

Method : Create a new selection

OBJECTID
Value
Count
Slope_RC
gSSURGO_hydgrp

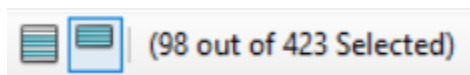
= <> Like 1
> >= And 2
< <= Or 3
_ % () Not 4
34
999

Is In Null Get Unique Values Go To:

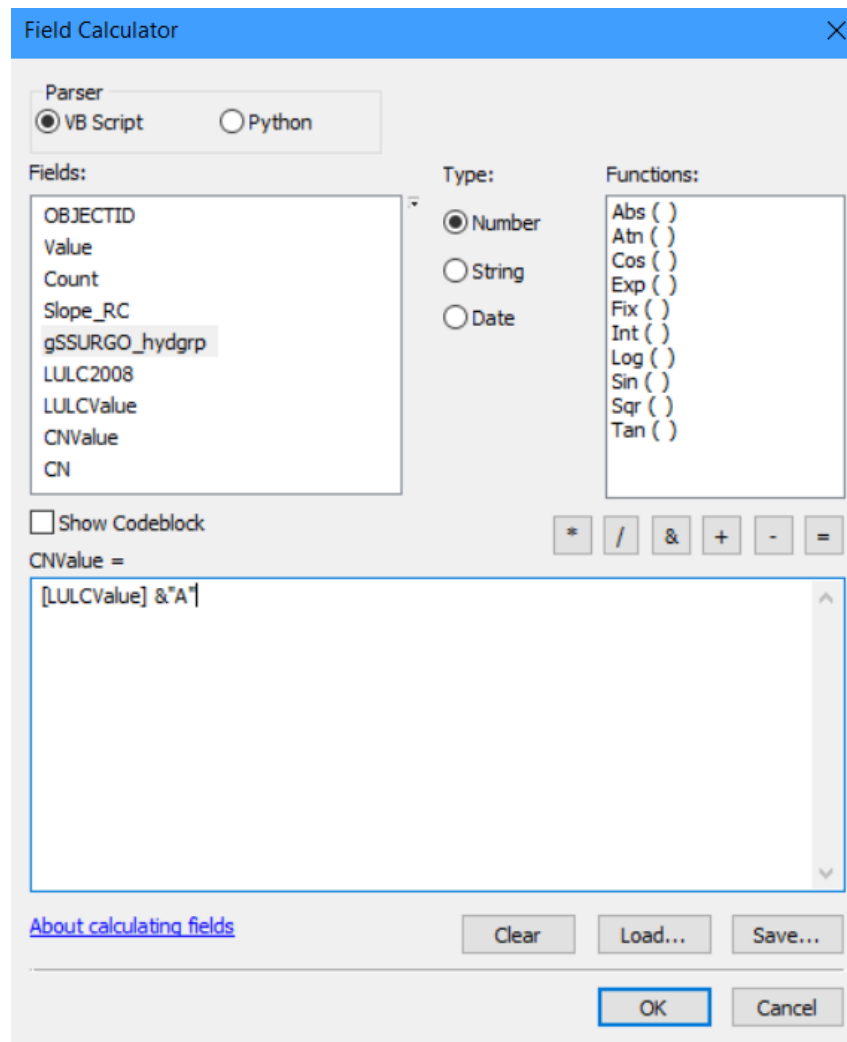
SELECT * FROM VAT_LULC_SL_hydgrp2008 WHERE:
gSSURGO_hydgrp = 1

Clear Verify Help Load... Save... Apply Close

Apply the selection and make only the selected features viewable. You should only be able to see records highlighted in blue



Right click on 'CNValue' and open **Field Calculator**. Set 'CNValue' equal to **[LULCValue] & "A"**



Repeat the selection and field calculator steps for all the soil types

1 = A

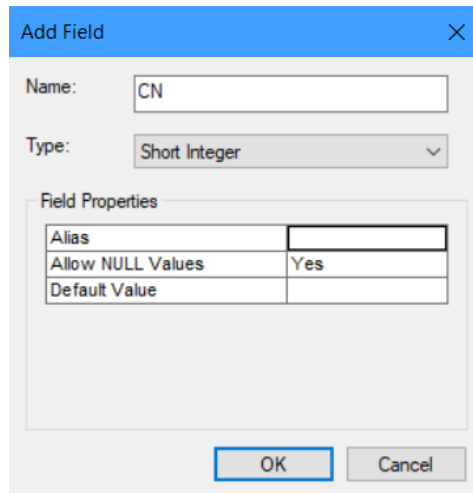
2 = B

3 = C

4 = D

34 = C/D

Add Field and name the new field 'CN', leaving the type as the default 'short integer'

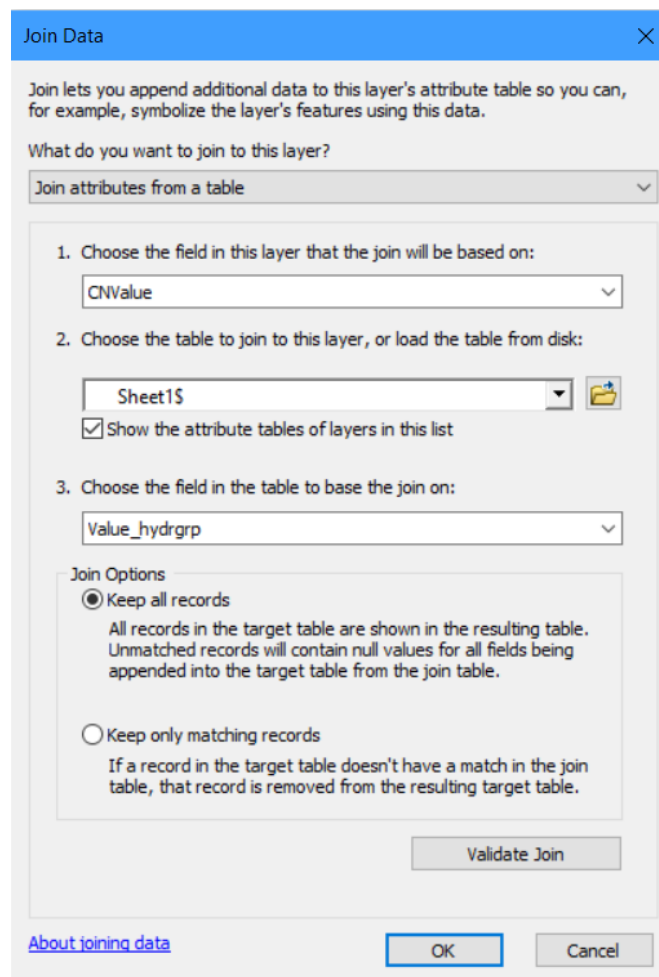


The 'Add Field' dialog box is shown with the following details:

- Name:** CN
- Type:** Short Integer
- Field Properties:**

Alias	
Allow NULL Values	Yes
Default Value	
- Buttons:** OK, Cancel

After all values have a CNValue and a soil type, **join** the 'CN_Table' to the layer using, 'CNValue' and 'Value_hydrgrp'



The 'Join Data' dialog box is shown with the following details:

- Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.**
- What do you want to join to this layer?**
Join attributes from a table
- 1. Choose the field in this layer that the join will be based on:**
CNValue
- 2. Choose the table to join to this layer, or load the table from disk:**
Sheet1\$
☒ Show the attribute tables of layers in this list
- 3. Choose the field in the table to base the join on:**
Value_hydrgrp
- Join Options:**
 - ☒ **Keep all records**
All records in the target table are shown in the resulting table. Unmatched records will contain null values for all fields being appended into the target table from the join table.
 - ☐ **Keep only matching records**
If a record in the target table doesn't have a match in the join table, that record is removed from the resulting target table.
- Buttons:** Validate Join, OK, Cancel
- Link:** [About joining data](#)

Right click on 'CN' and open **Field Calculator**. Set CN = to **[Sheet1\$.CN]**

NOTE: Your layer may not have Sheet1\$ as the title, but make sure the CN you are selecting is from the joined table

